



## FEDERAL COMMUNICATIONS COMMISSION

### 47 CFR Parts 15

[ET Docket No. 14-165, GN Docket No. 12-268, ET Docket No. 20-36 and ET Docket No. 04-186; FCC 22-6; FRS 78919]

### Unlicensed Operations in the Television Bands, Repurposed 600 MHz Band, 600 MHz Guard Bands and Duplex Gap, and Channel 37; Expanding the Economic and Innovation Opportunities of Spectrum Through Incentive Auctions; Unlicensed White Space Device Operations in the Television Bands.

**AGENCY:** Federal Communications Commission.

**ACTION:** Final rule.

**SUMMARY:** In this document, the Federal Communications Commission (Commission) adopts orders resolving pending issues associated with white space devices and databases. The actions being taken will provide additional certainty to white space device users, manufacturers and database administrators to enable unlicensed white space devices to operate efficiently and protect other spectrum users, in particular wireless microphone users. In the Second Order on Reconsideration, the Commission addresses petitions for reconsideration of the requirement established in the Commission's *White Spaces Report and Order* that white space databases "push" channel availability changes to white space devices when a licensed wireless microphone operator registers in the white space database to use a TV channel. The Commission removes the push notification requirement and replaces it with a simpler rule that requires certain white space devices to re-check the database more frequently. In the Order, the Commission denies a petition for reconsideration of the Office of Engineering and Technology's (OET's) designation of Nominet UK (now RED Technologies) as a white space database administrator.

**DATES:** Effective [INSERT DATE 30 DAYS AFTER DATE OF PUBLICATION IN THE FEDERAL REGISTER].

**FOR FURTHER INFORMATION CONTACT:** Hugh VanTuyl, Office of Engineering and Technology, (202) 418-7506 or [Hugh.VanTuyl@FCC.gov](mailto:Hugh.VanTuyl@FCC.gov).

**SUPPLEMENTARY INFORMATION:** This is a summary of the Commission’s document, *Second Order on Reconsideration and Order*, ET Docket No. 14-165, GN Docket No. 12-268, ET Docket No. 20-36 and ET Docket No. 04-186; FCC 22-6, adopted January 25, 2022 and released January 26, 2022.

The full text of this document is available for public inspection and can be downloaded at:

<https://www.fcc.gov/document/fcc-takes-action-unlicensed-white-space-device-database-issues>. When the FCC Headquarters reopens to the public, the full text of this document also will be available for public inspection and copying during regular business hours in the FCC Reference Center, 45 L Street, NE, Washington, DC 20554. Alternative formats are available for people with disabilities (Braille, large print, electronic files, audio format) by sending an email to [FCC504@fcc.gov](mailto:FCC504@fcc.gov) or calling the Commission’s Consumer and Governmental Affairs Bureau at (202) 418–0530 (voice), (202) 418–0432 (TTY).

### **Procedural Matters**

***Final Regulatory Flexibility Analyses.*** The Regulatory Flexibility Act of 1980 (RFA) requires that an agency prepare a regulatory flexibility analysis for notice and comment rulemakings, unless the agency certifies that “the rule will not, if promulgated, have a significant economic impact on a substantial number of small entities.” Accordingly, the Commission has prepared a Final Regulatory Flexibility Analysis (FRFA) concerning the possible impact of the rule changes contained in this Second Order on Reconsideration on small entities. As required by the RFA, an Initial Regulatory Flexibility Analysis (IRFA) was incorporated in the Notice of Proposed Rulemaking (*NPRM*) (86 FR 38969, July 23, 2021). The Commission sought written public comment on the proposals in the *NPRM*, including comments on the IRFA. No comments were filed addressing the IRFA. Accordingly, the Commission has prepared a Final Regulatory Flexibility Analysis (FRFA) concerning the possible impact of the rule changes contained in the document on small entities. The present FRFA conforms to the RFA and can be viewed under Appendix C of the item at: <https://www.fcc.gov/document/fcc-takes-action-unlicensed-white-space-device-database-issues>.

***Paperwork Reduction Act.*** This document does not contain new or modified information collection requirements subject to the Paperwork Reduction Act of 1995 (PRA), Public Law 104-13. In addition, therefore, it does not contain any new or modified information collection burden for small business

concerns with fewer than 25 employees, pursuant to the Small Business Paperwork Relief Act of 2002, Public Law 107-198, see 44 U.S.C. 3506©(4).

***Congressional Review Act.*** The Commission has determined, and the Administrator of the Office of Information and Regulatory Affairs, Office of Management and Budget, concurs, that this rule is “non-major” under the Congressional Review Act, 5 U.S.C. § 804(2). The Commission will send a copy of this Second Order on Reconsideration and Order to Congress and the Government Accountability Office pursuant to 5 U.S.C. § 801(a)(1)(A).

## **Synopsis**

### **BACKGROUND**

The existing rules prescribe communications between white space devices and a white space database to provide interference protection to other spectrum users – both to authorized services and protected users generally and to licensed wireless microphone operations that are registered at particular times and locations in the database. To provide general protection to authorized services (e.g., primary and secondary broadcast television users in the TV bands, wireless service providers in the 600 MHz service band) and protected users (e.g., TV translator receive sites and Multiple Video Program Distributor (MVPD) receive sites), white space devices must re-check the database at least once per day to obtain the list of available channels at the location where the device operates. The Commission established these timeframes because most protected services listed in its databases do not change on a frequent basis, and because the Commission provides updated data to the white space database administrators only once every weekday. To protect licensed wireless microphones operating in the TV bands that are registered in the white spaces database, the Commission requires more frequent communications in the event of microphone usage registrations that need more timely protection. In the 2015 *White Spaces Report and Order*, the Commission adopted the push notification requirement, which it believed to be an efficient way of achieving this objective. Furthermore, because licensed wireless microphone operations can be registered in any white space database, the Commission required that a white space database administrator share registration information with the other databases in a timely fashion.

The Commission’s decision to adopt the push notification requirement was intended to provide

protection to licensed wireless microphone operations that may, upon registering to operate on specified TV channels, need quick protection from potential interference from white space device operations. Prior to adopting the *Incentive Auction R&O* in 2014, which required repurposing and auctioning some TV band spectrum for new 600 MHz wireless service, the Commission had reserved two TV channels where white space devices were not permitted to operate to ensure that there would be spectrum available for wireless microphones used in applications such as electronic news gathering for which it is not possible to register the operating location in the database at least 24 hours in advance. In the *Incentive Auction R&O*, the Commission decided to no longer designate two unused television channels for wireless microphones and instead took steps to improve the operation of the white space database to provide more immediate protection to wireless microphones. To ensure that registered wireless microphone users continue to receive protection in a timely manner, the Commission then proposed in its 2014 *White Spaces NPRM* to: (1) require fixed and Mode II personal/portable white space devices to re-check the database at time intervals not to exceed 20 minutes, (2) eliminate the rule that allows a white space device to continue operating until 11:59 PM on the following day if it cannot establish contact with the database, and (3) require database administrators to share wireless microphone registration information between databases within ten minutes.

In the *White Spaces Report and Order* adopted in August of 2015 the Commission sought to balance the concerns of white space device and wireless microphone proponents when it adopted the push notification requirement in place of the proposed 20-minute re-check requirement to meet its objectives. The Commission was concerned that requiring all white space devices to re-check a database (regardless of their location) for a list of available channels every twenty minutes could unnecessarily burden the database administrators, adversely affect operation of white space devices relying on batteries for operation, and increase costs for white space device users. To ensure that channels would continue to be available for wireless microphones used for events that cannot be anticipated, such as late-breaking news events, the Commission concluded at that time, as suggested by parties in the record, that a reasonable and workable approach to accomplishing its goals was to require that database administrators “push” information to white space devices only in areas where licensed wireless microphones will be used, rather than requiring all white space devices to re-check a database every twenty minutes. Under this approach,

when a database administrator receives a registration request for immediate access to particular channels for licensed wireless microphone use, the database administrators would, within ten minutes, share the licensed wireless microphone's channel registration information among themselves and within 20 minutes of receiving that information, would "push" information about changes in channel availability to fixed and Mode II personal/portable white space devices. The Commission provided white space database administrators 12 months after the effective date of the rules, until December 23, 2016, to comply with this new requirement.

*Petitions for reconsideration.* Google and NAB each filed a petition requesting that the Commission reconsider the push notification requirement, although each express different concerns with the requirement. Google contends that the Commission failed to recognize that, as a technical matter, requiring databases to "push" information to devices is at least as burdensome as requiring devices to "pull" information from databases. Google states that in order for a database to send information to a white space device, the device must either request information very frequently to simulate a push, which dramatically increases server utilization and reduces battery life in devices relying on such a power source, or the device must maintain a persistent connection with the database, which uses bandwidth and reduces battery life by preventing the device from entering a sleep mode. It argues that the push rule would limit the use of battery powered, low-bandwidth, or remote white space devices designed to operate for very long periods on a single battery charge. It also argues that unless an unlicensed device makes frequent "pulls" from the database or maintains a persistent, open connection, security features implemented on the device or network may block database messages from reaching the device. Google further argues that limiting the geographic area for database pushes does not reduce the burden on unlicensed devices or databases because there is no way for a database to communicate information to a particular device unless all devices in all locations continually check for updates.

NAB argues that the push notification requirement is insufficient for providing technical assurance that white space devices will actually receive messages and cease operation on channels registered for use by licensed wireless microphones, and is concerned that white space devices may be used in internal private networks protected by firewalls that prevent external messaging. NAB states that if the Commission maintains the push notification approach, it must modify the rules to require that white

space devices be capable of receiving notifications, including when they are not in operation or connected to the internet, and further that devices send the database a confirmation when they have received and complied with a push notification.

Petitioners and commenting parties disagree, however, on what they view as the appropriate approach going forward. Google requests that the Commission require white space devices to contact the database more frequently on two designated “fast polling” channels, an approach similar to the one that Google had made in response to the *White Spaces NPRM* that the Commission had previously rejected in the *White Spaces Report and Order*. Google again suggests that the Commission can protect licensed wireless microphones by identifying two channels on which unlicensed devices would be required to query the database every 20 minutes, while allowing white space devices operating on other channels to check the database only once daily. It argues that designating two “fast-polling” channels would minimize the burden of constant rechecking on unlicensed devices and database operators, while providing adequate protection for wireless microphones used during breaking news events. Microsoft agrees with Google’s suggestion. Google and Microsoft point out that under the previous rules only two channels were available on short notice for exclusive wireless microphone use and argue that because licensed wireless microphone users have access to a dedicated four-megahertz channel in the 600 MHz duplex gap and the ability to reserve channels in advance of predictable events like games and concerts, designating two fast-polling channels would leave wireless microphone operators no worse off than before.

NAB requests that, in place of a push notification, the Commission require white space devices operating on any channel to contact the database every 20 minutes for an updated list of available channels, consistent with the Commission’s proposal in the *White Spaces NPRM*. NAB argues that requiring white space devices to contact the database to check on channel availability more frequently, coupled with a requirement that devices cease operation if they cannot contact the database, is simpler, more efficient, more cost-effective, and will provide greater protection for licensed wireless microphones without requiring manufacturers to redesign devices. Shure agrees with NAB’s suggestion.

Regarding Google’s proposed solution of creating two fast-polling channels, NAB contends that Google misinterprets the intent of the Commission’s push requirement and fails to reflect the policy

balance the Commission attempted to strike. NAB states that limiting polling to two channels does not provide licensed operations with the same capability and protection as under the Commission's previous rules or the same capability and protection as the Commission sought to provide with the push requirement. NAB further argues that Google's claim that polling on all channels would drive up database costs and adversely decrease device battery life is specious because the entire TV white space database is less than a couple of hundred kilobytes of data. Google counters that the issue is the frequency of database requests, not the size of the database or the amount of information transmitted in each request, and that increasing the number of requests 72-fold per day per device will be a burden on the database as white space devices become more widely deployed.

Only Key Bridge, a database administrator, disagrees that implementing a push capability for white space devices and databases is impractical. It argues that the Commission's requirement to implement push notifications is sound and should be upheld, and that the Commission should reject Google's and NAB's objections that managing white space devices is too difficult to implement.

*Push Notification Waiver Order.* By late 2016, while the petitions on push notification remained pending, no manufacturers had yet obtained certification for equipment that was capable of meeting the push notification requirement. Absent Commission action, all approved white space devices would have been required to cease operation no later than December 23, 2016. Accordingly, on December 22, 2016, the Commission adopted the *Push Notification Waiver Order* temporarily waiving the push notification requirements. OET has periodically extended this waiver several times since then, most recently on September 30, 2021 when it extended this waiver through March 31, 2022, or until the Commission takes final action on the petitions for reconsideration of the push notification rules, whichever comes earlier. As a result of these successive waiver orders, the push notification requirement has never come into effect. The Commission notes that since issuance of these waiver orders, no party has submitted additional suggestions for Commission consideration relating to the pending petitions.

## **Discussion**

The record before the Commission shows that the push notification requirement is viewed as problematic by advocates for licensed wireless microphone and white space device operations alike. The

Commission's goal all along has been to adopt rules that would serve to protect licensed wireless microphones quickly following registration while also minimizing the burden on white space device operations. Although the Commission believes that a push notification approach is technically achievable, and notes that it has required access systems with rapid response times that, like the push notification, are more complicated than a periodic database re-check in other bands (such as in the Citizens Broadband Radio Service), the Commission agrees with most commenters and concludes that there is no reason to require a push notification approach with respect to white space devices and the white space database system. As discussed below, replacing the push notification requirement with a more frequent re-check requirement will meet the requisite need for protecting a limited number of registered wireless microphones, and does so in a sufficiently expeditious fashion while not increasing the cost and complexity of white space devices and the database system by avoiding the need to redesign existing white space devices and the database system.

Therefore, on reconsideration, the Commission replaces the push notification requirement for fixed and Mode II personal/portable devices operating in the TV bands, except for narrowband devices (which are addressed in the Further Notice), with a simpler and more easily implementable approach, namely requiring that these fixed and personal/portable white space devices re-check the white space database at least once every hour, i.e., no longer than 60 minutes between re-checks. This frequent re-check requirement will protect licensed wireless microphone operations shortly following their database registration and will effectively protect registered licensed wireless microphone operations. The Commission adopts the requirement for white space devices to check the database every hour rather than every 20 minutes as it previously proposed because the Commission believe that this time-frame will be sufficient to accommodate licensed wireless microphones for unplanned events while reducing threefold the number of database rechecks each day. Reducing the number of database rechecks is important to ensure efficient white space device operation, reduce overhead on the networks, and maximize battery life for white space devices that are not connected to a reliable power source. To further reduce the impact on network traffic and white space devices, the Commission will not require devices that are in a sleep mode to re-check the database until they emerge from that state. Informed by the record before it, both by objections to the push notification requirement and by subsequent developments with regard to white



space device operations, the Commission again seeks to reach the right balance between licensed wireless microphone users and white space device users that share use of unused spectrum in the TV bands. The Further Notice seeks comment on the database re-check interval that should apply to the narrowband IoT white space devices and the mobile white space devices that the Commission authorized in the recently adopted *2020 White Spaces Report and Order*.

Although NAB and wireless microphone interests have requested requiring that white space devices re-check the database every 20 minutes, the Commission believes that requiring a re-check every 60 minutes will be sufficient and, by relying on a re-check approach instead of the more complex push notification approach, the Commission decision will serve to ensure the kind of reliable and effective protection those parties seek. The Commission also retains the requirement for database administrators to share Part 74 wireless microphone registration information with all other white space databases within ten minutes of a registration submission from a wireless microphone licensee. The Commission finds that these requirements will ensure that licensed wireless microphones used for electronic newsgathering and other unplanned uses can receive reliable and reasonably immediate protection from white space devices. In the Commission's considerations, it takes into account that, following completion of the Incentive Auction in 2017, licensed wireless microphone users have immediate and exclusive access to a 4-megahertz portion of the 600 MHz duplex gap and can also use a 2-megahertz portion of the 600 MHz guard band where white space devices are not permitted to operate, and that these wireless microphone operators potentially could make use of the 6-megahertz of the 600 MHz duplex gap available for unlicensed operations if white space devices are not operating at that location. Also, in many parts of the country the Commission would expect that there are likely to be one or more unused vacant TV channels available for wireless microphones that are not being used by white space devices.

The balanced approach that the Commission is adopting also does not impose an unreasonable burden on white space devices or database systems. Importantly, this approach is easily implementable. All currently approved white space devices already have the capability to re-check the white space databases at least once per day for a list of all available channels in their area, and updating software or firmware, or redesigning devices to increase the frequency of database checking is a fairly simple matter. The Commission also concludes that requiring fixed and personal portable white space devices, except for

narrowband IoT devices to re-check on an hourly basis, rather than every 20 minutes as previously proposed, sufficiently balances concerns of the white space device proponents concerned about potential battery issues while meeting the Commission's goal of quickly ensuring licensed wireless microphone access to TV channels for late-breaking events. The Commission also recognizes the concerns of Google and Microsoft that frequently waking a device from a sleep mode or preventing a device from entering a sleep mode to perform more frequent database checks or receive push notifications, could needlessly reduce the operational time of a battery powered device. Accordingly, the Commission will not require white space devices in sleep mode to contact the database. The Commission also believes that the increase in database traffic by changing to an hourly re-check interval will not be problematic for the white space database as computing power readily available today should be more than sufficient to manage twenty-four queries per day per white space device.

The Commission notes, however, as the number of white space devices that contact the database increases, more frequent re-checks from a significantly larger number of devices could have an impact on the databases. The Commission continues to believe that a push notification system could in some implementations potentially be more efficient if the number of white space devices that must contact the database is large. Accordingly, while the Commission is not requiring implementation of a push notification system, it is retaining an option for white space device manufacturers and database administrators in the future to develop and implement such a system, as had been permitted by the rules in effect prior to the *White Spaces Report and Order*. However, the Commission is not specifying detailed technical requirements for a push notification system. The Commission encourages the industry, if it determines that the need develops, to collaborate on a standard for push notifications to white space devices and the Commission will revisit this issue as necessary to facilitate the development and deployment of a system developed by industry that provides at least the same degree of protection to protected services as the rules the Commission is adopting herein.

The Commission rejects the suggestion by Google and Microsoft that the Commission should limit more frequent database re-checking to white space devices operating on only two designated channels, a reprise of the approach that the Commission previously rejected in the *White Spaces Report and Order* in 2015. The Commission does so for the same reasons. Because only a few channels would

be designated for “fast polling,” this approach is less flexible in meeting the needs of wireless microphone users for immediate access to spectrum because broadcasters covering breaking news events may have wireless microphones that operate on channels other than those designated for “fast polling.”

*Conforming edits.* Because the Commission is adopting a 60-minute re-check requirement for most fixed and personal/portable white space devices operating in the TV bands, it is also modifying certain other rules to conform its rules to this change. In particular, the Commission’s changes involve modifying existing rule provisions related to the requirement for white space devices to access the database on a daily basis.

Under current rules, a white space device is required to re-check the database at least once per day to obtain a list of available channels for operation. The rules also provide that if a white space device subsequently is unable to make contact with a database, operation is permitted to continue until 11:59 PM on the following day, and if by then, it cannot contact the database, it must cease operation until such time as it re-establishes contact. The Commission proposed eliminating these provisions when it proposed in its 2014 *White Spaces NPRM* to adopt a 20-minute re-check requirement for addressing registered licensed wireless microphone operations. When, however, the Commission adopted the push notification requirement in the *White Spaces Report and Order* instead of a 20-minute re-check requirement, it concluded that it should not eliminate the then-existing daily re-check rule and instead would leave in place the requirement that white space devices re-check the database at least once per day to obtain the list of available TV channels at the location where the device operates.

Because the Commission now adopts a 60-minute re-check requirement for fixed and personal/portable white space devices operating in the TV bands, other than narrowband IoT devices (discussed in the Further Notice), the Commission modifies the rules that require white space devices to only re-check the database once a day to obtain a list of available channels, and that permit these devices to continue operating using a channel on that list until 11:59 PM the following day when it cannot contact a database on a given day. Maintaining these rules would be inappropriate since this would allow white space devices that cannot contact a database to operate for a significantly longer time period than the 60-minute re-check interval the Commission is requiring for protecting licensed wireless microphones operating in the TV bands. The Commission notes that in response to its proposal in the *White Spaces*

*NPRM* to require that white space devices re-check the database every 20 minutes, several commenters agreed that the daily re-check provision in the rules, and permitting white space device to continue operating until 11:59 PM the following day when it is unable to contact the database, should be eliminated. Some commenters cautioned, though, that the Commission should permit a white space device to retry contacting the database one or more times before requiring that it discontinue operating because a white space device may occasionally be unable to make contact with the database within the designated polling interval. The Commission agrees. Accordingly, to ensure that white space devices may continue to operate during short network outages, the Commission will require fixed and personal/portable white space devices operating in the TV bands to cease operation after two failed scheduled checks, i.e., 120 minutes. This requirement will ensure that a white space device cannot continue to operate for an extended period of time on a channel that may be registered for use by a licensed wireless microphone in the event the white space device cannot contact a database to verify the list of available channels. This approach also is analogous to the current requirement that a white space device must cease operation after a time period no greater than two failed scheduled checks (a maximum of 48 hours for a re-check interval of 24 hours). The Commission retains the current re-check requirements for white space devices that operate outside of the TV bands as well as for narrowband and mobile devices, but seeks comment in the Further Notice on whether it should change the re-check requirements for those devices.

Because the Commission is reducing the length of time that white space devices may continue to operate when they cannot contact the database, it correspondingly reduces the time interval over which white space devices must adjust their channel usage in accordance with licensed wireless microphone scheduling information provided by the database. The Commission therefore requires that the white space database provide registered licensed wireless microphones scheduling information for the two hour time period after the white space device contacts the database. The white space device must adjust its use of channels in accordance with this scheduling information, i.e., it must cease using the channel during the times when a licensed wireless microphone is scheduled to use it. The Commission selects a time period of two hours because that is the maximum time that a white space device may operate if it is unable to contact the database. The Commission does not require white space devices operating outside

the TV bands, i.e., in the 600 MHz service bands, the upper 6-megahertz portion of the 600 MHz duplex gap and on channel 37, to adjust their use of channels in accordance with scheduling information provided by the white space database because wireless microphones do not operate on those frequencies on a licensed basis and thus there will be no scheduling information for the database to provide.

The Commission modifies Section 15.711 to implement the changes to the database re-check interval discussed above, and to streamline the applicable rules. Specifically, it revises paragraph (i) to remove the push notification requirement and replaces it with an option for manufacturers to develop a push notification system as the pre-2015 rules allowed. The Commission moves the requirement for white space databases to share licensed wireless microphone registrations with other white space databases within ten minutes from Section 15.711(i)(1) to Section 15.715(l). The Commission revises Section 15.711(h) to place the database re-check requirements for fixed and Mode II personal/portable devices in a single paragraph, rather than in separate paragraphs as under the current rules.

*Transition.* The Commission also adopts provisions establishing the transition requirements for white space device compliance with the newly established re-check requirements as set forth herein. The Commission notes that increasing the frequency of database checks can generally be done by reprogramming a white space device's software or firmware, thus enabling the new requirement to be met relatively quickly. Accordingly, the Commission requires that devices for which a certification application is approved by a Telecommunication Certification Body (TCB) beginning six months after the effective date of the rules must comply with the hourly database re-check requirement that replaces the daily re-check requirement. The Commission also requires that within six months after the effective date of the rules, all white space devices imported into or marketed within the United States comply with these requirements, regardless of when they were certified. Because white space devices already deployed generally should be able to download a software upgrade, the Commission also requires that previously approved fixed white space devices that can be re-programmed comply with the faster re-check requirement six months after the effective date of the rules. Finally, the Commission modifies Section 15.37(j) to specify these transition dates for the faster database re-check interval in place of the transition dates for the push notification requirement that the Commission eliminates.

## **ORDER**

In this Order, the Commission denies NAB's petition for reconsideration of OET's 2018 action designating Nominet UK as a white space database administrator. OET referred this petition to the Commission for action pursuant to Section 1.106(a) of the rules. Nominet addressed concerns raised by NAB shortly after it filed its petition. The Commission notes that in 2020 Nominet's database was subsequently transferred to RED Technologies, which currently serves as a white spaces database administrator.

*Background.* Pursuant to the white spaces rules, the Commission can designate one or more entities to administer a white space database system that provides lists of available channels to fixed, mobile and Mode II personal/portable white space devices. On November 16, 2017, Nominet filed a proposal with OET seeking to administer a white space database. After seeking comment on Nominet's proposal, on June 11, 2018, the Commission's OET designated Nominet as a white space database administrator, subject to certain conditions, including that Nominet's database would be subject to a 45-day public trial period before it would be made available for actual use by white space devices to allow interested parties an opportunity to check that the database is providing accurate results.

Following the 45-day public trial period, on September 19, 2018, OET gave final approval for Nominet to operate its white space database system. OET found that Nominet's white space database system was compliant with the Commission's rules and ready for operation, based on its own examination and testing of the Nominet database system and on the results of the public trial, including comments submitted to Nominet during and after the trial and Nominet's responses to those comments. As OET noted, during the trial period Nominet indicated that it successfully resolved three issues raised by NAB concerning Nominet's database system, including concerns about its channel availability calculator.

On October 19, 2018, NAB filed a petition for reconsideration of OET's designation of Nominet as a white space database administrator. NAB states that its review of Nominet's database indicated that it contains incorrect channel information for hundreds of TV stations and that it provides at least one incorrect available channel at more than three-quarters of twenty-six locations analyzed. NAB states that the Nominet database is extracting the wrong information from the Commission database and that its approval should be revoked until Nominet addresses these issues. NAB further argues that OET should

rework its internal processes and policies for approval of white space database administrators to ensure that sufficient testing is performed to detect errors, including testing with actual white space devices.

Nominet responded to NAB's petition by agreeing that NAB had identified discrepancies, but asserts that those discrepancies arose due to difficulties experienced when importing TV station data from the Commission's new Licensing and Management System (LMS), which had replaced the Commission's Consolidated Database System (CDBS). Nominet explains that it was the first database administrator required to use the LMS, and that all published material by the FCC regarding how to apply the white space rules to TV data pertains to CDBS, which had been used by all previous database administrators. Nominet concludes by stating it promptly addressed NAB's concerns, and that the changes required to correct the import procedure were applied on October 24, 2018, only days after NAB filed its petition for reconsideration on October 19, 2018. NAB did not respond directly to Nominet's response or identify specific ongoing errors that needed remedying.

The Commission notes that, subsequent to the designation of Nominet as a white space database administrator, and in response to a petition submitted by NAB in 2015, the Commission took steps in the *2019 White Spaces Order* to improve the accuracy and reliability of the fixed white space device data in the white space databases and ensure that the potential for these devices to cause harmful interference to protected services is minimized. Specifically, the Commission required all fixed white space devices to incorporate a geo-location capability such as GPS and eliminated the option that permitted the geographic coordinates of a fixed device to be determined by a professional installer. The Commission also adopted rules that allow the use of external geo-location sources by a fixed white space device when the device is used at a location where its internal geo-location capability does not function, such as deep inside a building. In addition, the Commission required fixed white space devices to re-check their geographic coordinates at least once a day and report the coordinates to the white space database.

*Discussion.* The Commission denies the NAB petition for reconsideration of OET's designation of Nominet as a white space database administrator. The Commission finds that the database errors discovered by NAB, which were immediately corrected by Nominet, are not grounds to revoke the designation of Nominet as a white space database administrator. As Nominet notes in its response to NAB's petition, Nominet was the first white space database administrator required to obtain TV station

data from the Commission's new LMS instead of the older, well-understood CDBS. The LMS has a more sophisticated data structure than the CDBS, thus requiring new and more complex algorithms than those used by other white space database administrators to extract the proper TV station facility information ("extraction logic") for input into the white space database. OET worked closely with Nominet to test the new extraction logic using Nominet's trial database to ensure that it functioned correctly. It appears that Nominet failed to include all of the updates made to the test database reviewed by OET in the final version that it made available for commercial use. As noted above, Nominet took action to remedy specific concerns raised by NAB. While the Commission is denying NAB's petition, the Commission underscores that it appreciates NAB bringing these concerns to the attention of the Commission and Nominet so that the errors could be remedied. However, the Commission does not believe that these errors show any fundamental deficiency on the part of the database administrator but appear to be the result of issues related to the Commission's transition from the CDBS to the LMS combined with an inadvertent failure by Nominet to include all of the latest updates in its final version of the database. Nominet promptly recognized its ongoing responsibility for remedying concerns brought to its attention. As noted above, in 2020, Nominet transferred its database to RED Technology, and NAB did not indicate any concerns about this transfer.

The Commission takes seriously the integrity of the white space database since that is the primary means to prevent white space devices from causing harmful interference to TV reception and other protected services. As noted above, the Commission at the suggestion of NAB took steps to increase the integrity of the white space database subsequent to the 2018 designation of Nominet as a white space database administrator. The changes adopted in the *2019 White Spaces Order* will ensure that fixed white space devices provide accurate coordinates to the white space database by requiring the incorporation of a geo-location mechanism in all fixed devices, as well as periodic re-checking of the coordinates by the white space device. The *2019 White Spaces Order* also clarifies the registration requirements for fixed white space devices. These changes reduce the likelihood that fixed devices will report incorrect coordinates to the database, which could result in harmful interference to TV reception and protected services, as well as ensure the database contains accurate registration information that could be used to help track down any devices that cause harmful interference. OET will continue to work with any white



space database administrator as well as any other interested party to ensure that the database provides accurate lists of available channels to white space devices.

## ORDERING CLAUSES

Accordingly, IT IS ORDERED that, pursuant to the authority contained in Sections 4(i), 302, 303(b), (c), (e), (f), (r), and 307 of the Communications Act of 1934, as amended, and sections 6403 and 6407 of the Middle Class Tax Relief and Job Creation Act of 2012, Pub. L. No. 112-96, 126 Stat. 156, 47 U.S.C. §§ 154(i), 302, 303(b), (c), (e), (f), (r), 307, 1452, 1454, this Second Order on Reconsideration, Further Notice of Proposed Rulemaking, and Order IS HEREBY ADOPTED.

IT IS FURTHER ORDERED that the petitions for reconsiderations filed by Google, Inc. and the National Association of Broadcasters on December 23, 2015 in ET Docket No. 14-165 ARE GRANTED IN PART AND DENIED IN PART to the extent described herein.

IT IS FURTHER ORDERED that Part 15 of the Commission's rules IS AMENDED as specified in Appendix A of the Second Order on Reconsideration, Further Notice of Proposed Rulemaking, and Order, and such rule amendments WILL BECOME EFFECTIVE 30 days after the date of publication in the *Federal Register*.

IT IS FURTHER ORDERED that the waiver of Sections 15.37(j) and 15.711(i) of the Commission's rules, 47 CFR 15.37(j) and 15.711(i), adopted by the Commission on September 30, 2021, DA 21-349, IS EXTENDED until the effective date of the rules adopted herein.

IT IS FURTHER ORDERED that the petition for reconsideration of Nominet UK's designation as a white space database administrator filed by the National Association of Broadcasters on October 19, 2018 in ET Docket No. 04-186 IS HEREBY DENIED.

IT IS FURTHER ORDERED that the Commission's Consumer and Governmental Affairs Bureau, Reference Information Center, SHALL SEND a copy of the Second Order on Reconsideration, Further Notice of Proposed Rulemaking, and Order, including the Final Regulatory Flexibility Analysis, to the Chief Counsel for Advocacy of the U.S. Small Business Administration.

Communications equipment.

FEDERAL COMMUNICATIONS COMMISSION.

Marlene Dortch,  
Secretary.

**Final Rules**

For the reasons set forth in the preamble, the Federal Communications Commission amends 47 CFR part 15 as follows:

1. The authority citation for part 15 continues to read as follows:

**AUTHORITY:** 47 USC 154, 302a, 303, 304, 307, 336, 544a, and 549.

2. Amend §15.37 by revising paragraph (j) to read as follows:

**§ 15.37 Transition provisions for compliance with the rules.**

\* \* \* \* \*

(j) White space devices which are approved by Telecommunication Certification Bodies beginning **[six months after the effective date of the rules]** shall comply with the database re-check requirements in § 15.711(h) of this part. White space devices that are in operation, imported or marketed beginning **[six months after the effective date of the rules]** shall also comply with these requirements.

\* \* \* \* \*

3. Amend §15.711 by revising paragraphs (c)(2)(iii), (d)(4), (h) and (i) to read as follows:

**§15.711 Interference avoidance methods.**

\* \* \* \* \*

(c) \* \* \*

(2) \* \* \*

(iii) A fixed white space device shall access the database at least as frequently as specified in paragraph (h) of this section to verify that the operating channel(s) and corresponding power levels continue to remain available. The fixed device's registration information shall be updated if the geographic coordinates reported to the database differ by more than  $\pm 50$  meters from the previously registered coordinates.

\* \* \* \* \*

(d) \* \* \*

(4) A Mode II personal/portable white space device that has been in a powered state shall re-check its location and access the database at least as frequently as specified in paragraph (h) of this section to verify that the operating channel(s) and corresponding power levels continue to be available.

\* \* \* \* \*

(h) *Database re-check requirement.* (1) Fixed and Mode II personal/portable devices, except for narrowband devices, operating in the television bands.

(i) A device that has been in a powered-on state shall access the white space database at least once every 60 minutes to verify that the operating channel(s) and associated maximum power levels continue to be available at its location. Devices shall adjust their channel usage in accordance with the most recent channel availability schedule information provided by the white space database for the two-hour period beginning at the time of the device last accessed the database for a list of available channels.

(ii) If a device fails to successfully contact the white space database, it may continue to operate until no longer than 120 minutes after the last successful contact, at which time it must cease operations until it reestablishes contact with the white space database and re-verifies its list of available channels and associated maximum power levels.

(2) Narrowband devices operating in the television bands and fixed and Mode II personal/portable devices operating outside of the television bands.

(i) A device that has been in a powered-on state shall access the database at least once a day to verify that the operating channel(s) and associated maximum power levels continue to be available at its location.

(ii) If a device fails to successfully contact the white space database during any given day, it may continue to operate until 11:59 p.m. of the following day at which time it must cease operations until it re-establishes contact with the white space database and re-verifies its list of available channels and corresponding power levels.

(i) *Push notifications.* Device manufacturers and database administrators may implement a system that pushes updated channel availability information from the database to white space devices. However, the use of such systems is not mandatory, and the requirements for white space devices to validate the

operating channel and to cease operation in accordance with paragraph (h) of this section continue to apply if such a system is used.

\* \* \* \* \*

4. Amend § 15.715 by revising paragraph (l) to read as follows:

**§15.715 White space database administrator.**

\* \* \* \* \*

(l) If more than one database is developed, the database administrators shall cooperate to develop a standardized process for providing on a daily basis or more often, as appropriate, the data collected for the facilities listed in §15.713(b)(2) to all other white space databases to ensure consistency in the records of protected facilities. In response to a request for immediate access to a channel by a licensed wireless microphone user, white space database administrators are required to share the licensed microphone channel registration information to all other white space database administrators within 10 minutes of receiving each wireless microphone registration.

\* \* \* \* \*